NON-ZERO ELEMENTS OF THE MATRICES IN EQS. (2) AND (8)

The following notation is used to express the matrix elements: Re is the Reynolds number, Pr is the Prandtl number, M_e is the Mach number at the boundary layer edge and g is the specific heat ratio. Additionally, $r = 2(e+2)/3$ and $m = 2(e-1)/3$ where $e = 0$ corresponds to the Stokes hypothesis. $U_s(y)$, $W_s(y)$, $T_s(y)$, and $m_s(y)$ are mean-flow profiles. Furthermore, a is the streamwise wave number, b is the spanwise wave number and p is the Laplace variable.

We denote $D = \dfrac{d}{dy}$ and $m_s' = dm_s / dT_s$. $\mathbf{H}^{ij}$ denotes the (i, j) element of matrix $\mathbf{H}$.

$H_{10}^{21} = Re / m_s T_s$, $H_{10}^{34} = -g M_e^2$, $H_{10}^{35} = 1/T_s$, $H_{10}^{43} = -1/T_s$,

$H_{10}^{64} = -\left(RePr / m_s\right)\left(g - 1\right) M_e^2$, $H_{10}^{65} = RePr / T_s m_s$, $H_{10}^{87} = Re / T_s m_s$,

$H_{11}^{12} = 1$, $H_{11}^{22} = -D\left(\ln m_s\right)$, $H_{11}^{23} = \left(Re / T_s m_s\right) DU_s$,

$H_{11}^{25} = -D\left(m_s' DU_s\right) / m_s$, $H_{11}^{26} = -\left(m_s' / m_s\right) DU_s$, $H_{11}^{33} = DT_s / T_s$,

$H_{11}^{56} = 1$, $H_{11}^{62} = -2DU_s Pr\left(g - 1\right) M_e^2$, $H_{11}^{63} = \left(RePr / T_s m_s\right) DT_s$,

$H_{11}^{68} = -2PrDW_s\left(g - 1\right) M_e^2$, $H_{11}^{66} = -2m_s' DT_s / m_s$,

$H_{11}^{65} = -\left(Pr\left(g - 1\right) M_e^2 / m_s\right) m_s' \left(DU_s\right)^2 - D\left(m_s' DT_s\right) / m_s - \left(Pr\left(g - 1\right) M_e^2 / m_s\right) m_s' \left(DW_s\right)^2$,

$H_{11}^{78} = 1$, $H_{11}^{83} = \left(Re / T_s m_s\right) DW_s$, $H_{11}^{85} = -D\left(m_s' DW_s\right) / m_s$,

$H_{11}^{86} = -\left(m_s' / m_s\right) DW_s$, $H_{11}^{88} = -D\left(\ln m_s\right)$, $H_2^{21} = ReU_s / T_s m_s$,

$$H_2^{23} = -D(\ln m_s), \quad H_2^{24} = Re / m_s, \quad H_2^{31} = -1, \quad H_2^{34} = -g M_e^2 U_s,$$

$$H_2^{35} = U_s / T_s, \quad H_2^{41} = mDm_s / Re, \quad H_2^{42} = (m+1) m_s / Re,$$

$$H_2^{43} = -U_s / T_s, \quad H_2^{45} = m_s' D U_s / Re, \quad H_2^{63} = -2 Pr D U_s (g-1) M_e^2,$$

$$H_2^{64} = -(RePr / m_s)(g-1) M_e^2 U_s, \quad H_2^{65} = (RePr / T_s m_s) U_s,$$

$$H_2^{87} = ReU_s / T_s m_s, \quad H_3^{23} = -(m+1), \quad H_4^{21} = -r, \quad H_4^{43} = m_s / Re,$$

$$H_4^{65} = -1, \quad H_4^{87} = -1, \quad L_0^{43} = -r m_s / Re, \quad H_5^{21} = ReW_s / T_s m_s,$$

$$H_5^{34} = -g M_e^2 W_s, \quad H_5^{35} = W_s / T_s, \quad H_5^{37} = -1, \quad H_5^{43} = -W_s / T_s,$$

$$H_5^{45} = m_s' D W_s / Re, \quad H_5^{47} = mDm_s / Re, \quad H_5^{48} = (m+1) m_s / Re,$$

$$H_5^{63} = -2 Pr D W_s (g-1) M_e^2, \quad H_5^{64} = -(RePr / m_s)(g-1) M_e^2 W_s,$$

$$H_5^{65} = (RePr / T_s m_s) W_s, \quad H_5^{83} = -D(\ln m_s), \quad H_5^{84} = Re / m_s,$$

$$H_5^{87} = ReW_s / T_s m_s, \quad H_6^{27} = -(m+1), \quad H_6^{81} = -(m+1),$$

$$H_7^{83} = -(m+1), \quad H_8^{21} = -1, \quad H_8^{65} = -1, \quad H_8^{87} = -r, \quad H_8^{43} = m_s / Re,$$

$$H_0^{12} = 1, \quad H_0^{21} = a^2 + b^2 + i(aU_s + bW_s - ip) Re / m_s T_s,$$

$$H_0^{22} = -Dm_s / m_s, \quad H_0^{23} = -ia\,(m+1) DT_s / T_s - ia\,Dm_s / m_s + ReDU_s / m_s T_s,$$

$$H_0^{24} = ia\,Re / m_s - (m+1) g M_e^2 a\,(aU_s + bW_s - ip),$$

$$H_0^{25} = a\,(m+1)(aU_s + bW_s - ip) / T_s - D(m_s' D U_s) / m_s,$$

$$H_0^{26} = -m_s' D U_s / m_s, \quad H_0^{31} = -ia, \quad H_0^{33} = DT_s / T_s,$$

$$H_0^{34} = -ig M_e^2 (a\,U_s + bW_s - ip), \quad H_0^{35} = i(aU_s + bW_s - ip) / T_s,$$

$$H_0^{37} = -ib\,, \quad c = \left[Re/m_s + irgM_e^2\left(aU_s + bW_s - ip\right)\right]^{-1},$$

$$H_0^{41} = -iac\left(rDT_s/T_s + 2Dm_s/m_s\right), \quad H_0^{42} = -ica\,,$$

$$H_0^{43} = c\left[-a^2 - b^2 - i\left(aU_s + bW_s - ip\right)Re/m_sT_s + rD^2T_s/T_s + rDm_sDT_s/m_sT_s\right],$$

$$H_0^{44} = -icrgM_e^2\left[aDU_s + bDW_s + \left(aU_s + bW_s - ip\right)\left(DT_s/T_s + Dm_s/m_s\right)\right],$$

$$H_0^{45} = ic\left[\left(aDU_s + bDW_s\right)\left(r/T_s + m_s'/m_s\right) + r\left(aU_s + bW_s - ip\right)Dm_s/m_sT_s\right],$$

$$H_0^{46} = irc\left(aU_s + bW_s - ip\right)/T_s\,, \quad H_0^{47} = -ibc\left(rDT_s/T_s + 2Dm_s/m_s\right),$$

$$H_0^{48} = -ibc\,, \quad H_0^{56} = 1, \quad H_0^{62} = -2\left(g-1\right)M_e^2 PrDU_s\,,$$

$$H_0^{63} = -2i\left(g-1\right)M_e^2 Pr\left(aDU_s + bDW_s\right) + RePrDT_s/m_sT_s\,,$$

$$H_0^{64} = -iRePr\left(g-1\right)M_e^2\left(aU_s + bW_s - ip\right)/m_s\,,$$

$$H_0^{65} = a^2 + b^2 + iRePr\left(aU_s + bW_s - ip\right)/m_sT_s - \left(g-1\right)M_e^2 Prm_s'\left[\left(DU_s\right)^2 + \left(DW_s\right)^2\right]/m_s - D^2m_s/m_s\,,$$

$$H_0^{66} = -2Dm_s/m_s\,, \quad H_0^{68} = -2\left(g-1\right)M_e^2 PrDW_s\,, \quad H_0^{78} = 1,$$

$$H_0^{83} = -i\left(m+1\right)bDT_s/T_s - ibDm_s/m_s + ReDW_s/m_sT_s\,,$$

$$H_0^{84} = -\left(m+1\right)gM_e^2 b\left(aU_s + bW_s - ip\right) + ibRe/m_s\,,$$

$$H_0^{85} = \left(m+1\right)b\left(aU_s + bW_s - ip\right)/T_s - D\left(m_s'DW_s\right)/m_s\,,$$

$$H_0^{86} = -m_s'DW_s/m_s\,, \quad H_0^{87} = a^2 + b^2 + iRe\left(aU_s + bW_s - ip\right)/m_sT_s\,,$$

$$H_0^{88} = -Dm_s/m_s$$